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| 10/073,909 | 02/14/2002 | Carsten Juncker | 042933/305704 | 4766 |

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EXAMINER

CHO, UN C

ART UNIT PAPER NUMBER

2687

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/073,909

Applicant(s)

JUNCKER ET AL.

Examiner

Un C. Cho

Art Unit

2687

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-12, 16, 26-30, 33-37 and 40 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 13-15, 17-25, 31, 32, 38, 39 and 41-49 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 3, 8, 9, 10, 26, 27, 28, 33, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. (US 6,449,489) in view of Winters et al. (US 6,505,053) and further in view of the admitted prior art (Page 1, lines 7 – 23).

Regarding claim 1, Lu discloses a method of estimating the Doppler shift of a radio signal comprising: receiving a radio signal (the user equipment receives a communication signal, Lu, Col. 8, lines 60 – 61), and computing an estimate of the Doppler shift of said radio signal (the Doppler shift of the received communication signal is calculated by the user equipment, Lu, Col. 8, lines 63 – 64).

However, Lu does not specifically disclose the feature of deriving a value for the derivative of the envelope of the path transfer function for said radio signal. In an analogous art, Winters discloses deriving a result after the complex envelope of the received signal passes through the filtering process (Winters, Col. 3, lines 24 – 49 and Col. 8, lines 28 – 39). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Winters to the system of Lu in order to provide an

improved performance in wireless mobile communication networks by improving the ability of the system to correct for fading behavior.

However, Lu in view of Winters as applied above does not specifically disclose estimating a Doppler spread. In an analogous art, the admitted prior art discloses that Doppler spread is generated through plurality of Doppler shifts (the admitted prior art, Page 1, lines 8 – 16). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of the admitted prior art to the modified system of Lu and Winters in order to provide the knowledge of the Doppler spread for enhancing the accuracy and operation of the receivers.

Regarding claim 2, Lu in view of Winters and further in view of the admitted prior art as applied to claim 1 above discloses that the incoming complex baseband signal is filtered through a filter containing a low pass filter (LPF) and a finite impulse response filter (FIR) (Winters, Col. 4, lines 6 – 39).

Regarding claim 3, Lu in view of Winters and further in view of the admitted prior art as applied to claim 1 discloses that the envelope signal comprises samples representing the envelope (Winters, Col. 3, lines 24 – 67).

Regarding claim 8, Lu in view of Winters and further in view of the admitted prior art discloses a method of estimating the Doppler shift of a radio signal comprising: receiving a radio signal (the user equipment receives a communication signal, Lu, Col. 8, lines 60 – 61), deriving a result after the complex envelope of the received signal passes through the filtering process

(Winters, Col. 3, lines 24 – 49 and Col. 8, lines 28 – 39), computing an estimate of the Doppler shift of said radio signal (the Doppler shift of the received communication signal is calculated by the user equipment, Lu, Col. 8, lines 63 – 64) and deriving a value for the speed of said mobile station from said Doppler shift estimate (Lu, Col. 6, lines 1 – 19).

Regarding claims 9, 27 and 34, the claims are interpreted and rejected for the same reason as set forth in claim 2.

Regarding claims 10, 28 and 35, the claims are interpreted and rejected for the same reason as set forth in claim 3.

Regarding claim 26, the claim is interpreted and rejected for the same reason as set forth in claim 1.

Regarding claim 33, the claim is interpreted and rejected for the same reason as set forth in claim 8.

3. Claims 4, 5, 11, 12, 16, 29, 30, 36, 37 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu in view of Winters and further in view of the admitted prior art as applied to claim 1 above, and further in view of Mallette et al. (US 6,636,574).

Regarding claim 4, Lu in view of Winters and further in view of the admitted prior art as applied to claim 1 above does not specifically disclose that the computing of said estimate of the Doppler spread comprises determining the variance of said derivative value. In an analogous art, Mallette discloses that the

Doppler spread is estimated based on the estimated auto covariance function estimated from the magnitude of the signal squared or the Doppler spread estimate based on the estimated autocorrelation from both the in-phase and quadrature components of the received signal (incoming signals inherently pass through a LPF (not shown), thus it is assumed that estimating of auto covariance is done after) (Mallette, Col. 3, line 67 through Col. 4, line 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Mallette to the modified system of Lu, Winters and the admitted prior art in order to provide estimating of Doppler spread with improved noise immunity.

Regarding claim 5, Lu in view of Winters, further in view of the admitted prior art and further in view of Mallette as applied to claim 4 above discloses computing of the estimate of the Doppler shift comprises determining a value indicative of the received power of said radio signal (Lu, Col. 6, lines 1 – 19 and lines 44 – 67).

Regarding claims 11, 29 and 36, the claims are interpreted and rejected for the same reason as set forth in claim 4.

Regarding claims 12, 30 and 37, the claims are interpreted and rejected for the same reason as set forth in claim 5.

Regarding claim 16, Lu in view of Winters, further in view of the admitted prior art and further in view of Mallette as applied to claim 4 above discloses receiving a radio signal (the user equipment receives a communication signal,

Lu, Col. 8, lines 60 – 61), deriving first and second values for the derivative of the envelope of said radio signal (Doppler spread being proportional to the product of the first and second ratios, Mallette, Col. 3, lines 46 – 55), computing first and second estimates of the Doppler spread of said radio signal from said derivative values (first and second values are estimated, Mallette, Col. 2, lines 55 – 65) and deriving a value for the speed of said mobile station from said Doppler spread estimates (Lu, Col. 6, lines 1 – 19).

Regarding claim 40, the claim is interpreted and rejected for the same reason as set forth in claim 16.

Allowable Subject Matter

4. Claims 6, 7, 13, 14, 15, 17 – 25, 31, 32, 38, 39 and 41 – 49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 6, Lu in view of Winters, further in view of the admitted prior art and Mallette discloses estimating the Doppler spread. However, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the Doppler spread estimate is calculated by determining the

square root of the result of dividing twice said variance by said value indicative of the received power of the signal.

Regarding claim 7, Lu in view of Winters, further in view of the admitted prior art and Mallette discloses estimating the Doppler spread. However, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the Doppler estimate is calculated in accordance with the formula shown in claim 7.

Regarding claims 13, 31 and 38, the claims are interpreted and objected for the same reason as set forth in claim 6.

Regarding claims 14, 32 and 39, the claims are interpreted and objected for the same reason as set forth in claim 7.

Regarding claim 15, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the speed of the mobile station is calculated in accordance with the formula shown in claim 15.

Regarding claim 17, Lu in view of Winters and further in view of the admitted prior art discloses that the incoming complex baseband signal is filtered through a filter containing a low pass filter (LPF) and a finite impulse response filter (FIR) (Col. 4, lines 6 – 39). However, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the first value for the derivative of the envelope of said radio signal is derived by low-pass filtering an envelope signal representing the path transfer function envelope to band limit it and filtering the band-limited envelope signal using an FIR filter and said second

value for the derivative of the envelope of said radio signal is derived by low-pass filtering an envelope signal representing the path transfer function envelope to band limit it and filtering the band-limited envelope signal using an FIR filter, the first value being derived using a low-pass filter characteristic having a lower cut-off frequency than that of the low-pass filter characteristic used for deriving said second value.

Regarding claim 23, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the Doppler spread estimates are calculated in accordance with the formula shown in claim 23.

Regarding claim 24, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose deriving first and second speed estimates values from the first and second Doppler spreads respectively and selecting the first or second speed estimate value dependent on the magnitude of the first or second speed estimate value to provide said speed estimate.

Regarding claim 25, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the first and second speed estimate values are calculated in accordance with the formula shown in claim 25.

Regarding claim 41, Lu in view of Winters and further in view of the admitted prior art discloses that the incoming complex baseband signal is filtered through a filter containing a low pass filter (LPF) and a finite impulse response filter (FIR) (Col. 4, lines 6 – 39). However, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the first value for the

derivative of the envelope of said radio signal is derived by low-pass filtering an envelope signal representing the path transfer function envelope to band limit it and filtering the band-limited envelope signal using an FIR filter and said second value for the derivative of the envelope of said radio signal is derived by low-pass filtering an envelope signal representing the path transfer function envelope to band limit it and filtering the band-limited envelope signal using an FIR filter, the first value being derived using a low-pass filter characteristic having a lower cut-off frequency than that of the low-pass filter characteristic used for deriving said second value.

Regarding claim 47, Lu, Winters, the admitted prior art and Mallette either alone or in combination fails to disclose that the Doppler spread estimates are calculated in accordance with the formula shown in claim 47.

Regarding claim 48, the claim is interpreted and objected for the same reason as set forth in claim 24.

Regarding claim 49, the claim is interpreted and objected for the same reason as set forth in claim 25.

Response to Arguments

6. Applicant's arguments filed 11/3/2005 have been fully considered but they are not persuasive.

The applicant presented the argument that the references provided by the examiner fails to teach the claimed invention. The examiner disagrees with the argument presented by the applicant and the reasoning is as followed.

Regarding claim 1, the applicant argued that the references by Lu in view of Winters and in view of the admitted prior art fails to teach the claimed invention. Lu clearly discloses a method of estimating the Doppler shift of a radio signal in a user equipment by receiving a radio signal from the system equipment (i.e. base station); a module (i.e. circuit or device, Fig. 7, 704) which is configured to receive communication signals and derive at least one characteristic of the received signal; and from the at least one characteristic of the received signal derive Doppler shift (Lu, Col. 6, lines 1 – 7, 44 – 67; Col. 7, lines 25 – 45 and Col. 8, lines 58 – 67).

Therefore, the office action mailed on 6/3/2005 stands.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any


extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Un C. Cho whose telephone number is (571) 272-7919. The examiner can normally be reached on M ~ F 8:00AM to 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Un C Cho
Examiner
Art Unit 2687

1/10/06 


LESTER G. KINCAID
SUPERVISORY PRIMARY EXAMINER